

UNITED STATES DISTRICT COURT  
CENTRAL DISTRICT OF CALIFORNIA

CIVIL MINUTES – GENERAL

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CASE NO.: CV 2:18-3837 SJO (SKx)

DATE: September 27, 2019

TITLE: Seoul Semiconductor Co., Ltd., et al. v. Bed Bath & Beyond, Inc.

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PRESENT: THE HONORABLE S. JAMES OTERO, UNITED STATES DISTRICT JUDGE

Victor Paul Cruz Not Present  
Courtroom Clerk Court Reporter

**COUNSEL PRESENT FOR PLAINTIFFS:** **COUNSEL PRESENT FOR DEFENDANTS:**

Not Present Not Present

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**PROCEEDINGS (in chambers): CLAIM CONSTRUCTION ORDER**

Plaintiffs Seoul Semiconductor Co., Ltd. and Seoul Viosys Co., Ltd. (together, "SSC" or "Plaintiffs") and Defendant Bed Bath & Beyond, Inc. ("BB&B" or "Defendant") have filed claim construction briefs in which they ask the Court to construe nine (9) disputed phrases found in six of the patents asserted in this litigation: U.S. Patent No. 6,942,731 ("the '731 Patent"), U.S. Patent No. 7,982,207 ("the '207 Patent"), U.S. Patent No. 8,120,054 ("the '054 Patent"), U.S. Patent No. 8,168,988 ("the '988 Patent"), U.S. Patent No. 9,577,157 ("the '157 Patent"), and U.S. Patent No. 9,716,210 ("the '210 Patent") (collectively, the "Patents-in-Suit"). Plaintiffs filed their Opening Claim Construction Brief ("Pl.'s Brief") on May 23, 2019. Defendant filed its Responsive Claim Construction Brief ("Def.'s Brief") on June 6, 2019, and Plaintiffs replied ("Pl.'s Reply") on June 13, 2019. The parties simultaneously filed supplemental briefs on July 11, 2019 at the request of the Court. The Court heard argument from counsel on September 11, 2019.

I. FACTUAL AND PROCEDURAL BACKGROUND

Plaintiffs initiated the instant patent infringement action on May 8, 2018. (See Complaint, ECF No. 1.) In their Complaint, Plaintiffs assert that several of BB&B's LED light bulb products—namely the FEIT Electric BPC7/LED/CAN ("BPC7"), FEIT Electric OM60/850/LED/CAN ("OM60"), FEIT Electric G25/DM/LEDG2 ("G25"), FEIT Electric BR30/GROW/LEDG2 ("BR30"), and Luminance L7583-2 ("L7583")—infringe the Patents-in-Suit, which cover a range of Light Emitting Diode ("LED") technology. (See generally, Complaint.) Defendant denies infringement and asserts affirmative defenses of, among others, non-infringement, invalidity, prosecution history estoppel, failure to mark under 35 U.S.C. § 287, and patent exhaustion. (See generally, Answer, ECF No. 21.) On October 25, 2018, the Court held a scheduling conference in which it ordered that the Northern District of California's Patent Local Rules will govern the case and set a claim construction ("Markman") hearing for June 6, 2019. (Minutes of Sched. Conf., ECF No. 26.)

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The parties initially sought construction of sixteen separate claim terms, however, the Court held a telephonic status conference on April 17, 2019, during which it asked the parties to work together to reduce the number of disputes. (Minutes of Telephonic Conference, ECF No. 51.) In order to allow the parties time to do so, the Court granted a stipulation to continue the Markman hearing to June 27, 2019. (Minute Order, ECF No. 59.) After claim construction briefing had been filed, the Court determined that supplemental briefing was required and ultimately continued the Markman hearing to September 11, 2019. (Text Entry, ECF No. 66; Joint Stipulation, ECF No. 70.)

**II. LEGAL STANDARDS**

**A. Principles of Claim Construction**

Before a jury can determine if any of the asserted claims are invalid or if the defendant's technology infringes one or more asserted claims, the court must determine the meaning and scope of the asserted claims through the process of "claim construction." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370, 116 S. Ct. 1384 (1996). Only after the claims have been construed can the jury compare the allegedly infringing device against the claims. *Id.*

In *Phillips v. AWH Corp.*, 415 F.3d 1303, 1311-24 (Fed. Cir. 2005) (en banc), the en banc Federal Circuit set forth a number of principles to guide lower courts through the claim construction process. The general rule is that the words of a claim "are generally given their ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1312-13 (citations omitted). "[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* at 1313.

"In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314. "In such circumstances, general purpose dictionaries may be helpful." *Id.* Where, however, "determining the ordinary and customary meaning of the claim requires examination of terms that have a particular meaning in a field of art," courts look to other sources, including "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Id.* (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

Moreover, "[t]he claims themselves provide substantial guidance as to the meaning of particular claim terms," for example by observing "the context in which a term is used in the asserted claim." *Id.* Comparing the usage of a term across different claims and examining differences among claims can also provide valuable insight into the meaning of claim terms. *Id.*

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"The claims, of course, do not stand alone," and the specification provides "the single best guide to the meaning of a disputed term." *Id.* at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). One reason the specification is of paramount importance is that it "may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess." *Id.* at 1316; see also *Markman*, 52 F.3d at 980 ("[A] patentee is free to be his own lexicographer."). That said, "[t]hough understanding the claim language may be aided by explanations contained in the written description, it is important not to import into a claim, limitations that are not part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment." *Superguide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004). Moreover, the prosecution history, which consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent, may also shed "decisive light" on the proper construction of a claim term, particularly where an applicant limits her invention to overcome prior art. *Regents of Univ. of Cal. v. Dakocytomation Cal., Inc.*, 517 F.3d 1364, 1372-73 (Fed. Cir. 2008); *Phillips*, 415 F.3d at 1316-17; *N. Am. Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 1345 (Fed. Cir. 2005); *Seachange Int'l, Inc. v. C-Cor Inc.*, 413 F.3d 1361, 1372-73 (Fed. Cir. 2005).

District courts may also rely on extrinsic evidence, which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises," in construing claims, although such evidence is afforded less significance than the intrinsic record. *Phillips*, 415 F.3d at 1317 (citations omitted). "[W]hile extrinsic evidence 'can shed useful light on the relevant art,' we have explained that it is 'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Id.* (citations omitted).

In summation, although "there is no magic formula or catechism for conducting claim construction . . . [,] certain types of evidence are more valuable than others," and "what matters is for the court to attach the appropriate weight" to each piece of evidence. *Phillips*, 415 F.3d at 1324.

**III. DISCUSSION**

**A. Term 1: "quantum dot layer"**

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"quantum dot layer" ('731 Patent)	an active medium including nanoscale particles of semiconductor material	an active medium consisting of quantized electronic structures deposited on a substrate that is distinct from a semiconductor layer

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The parties agree that this term describes an active medium that includes quantum dots, however, they dispute (1) what a "quantum dot" is, (2) whether the quantum dots must be "deposited on a substrate", and (3) whether the quantum dot layer must be "distinct from a semiconductor layer." After a brief technological overview, the Court will address each dispute in turn.

**1. '731 Patent Technological Background**

The '731 Patent issued on September 13, 2005 and claims priority to an earlier German patent application filed August 30, 2000. ('731 Patent, Caption.) The claimed invention provides for "a method for improving the efficiency of epitaxially grown quantum dot semiconductor components having at least one quantum dot layer." ('731 Patent, Abstract.) The patent explains that quantum dot ("QD") components had existed for quite some time, however there was no reliable way to deposit epitaxial layers "at the ideal temperature for that particular material" because the optimum growth temperature for an epitaxial layer may create defects in the quantum dots. ('731 Patent 1:15-2:25.) The purpose of the invention described in the '731 Patent is "to provide a method with which a definite improvement in the efficiency of epitaxially produced quantum dot semiconductor elements is possible by reducing electric losses and optical scattering losses." ('731 Patent 2:26-29.) This is accomplished by interrupting growth once the quantum dots have been "overgrown with a layer of semiconductor material at least thick enough to completely cover all the quantum dots" and allowing any defects to heal. ('731 Patent 2:34-43; *id.* 4:13-17.)

**2. Analysis**

**a. Definition of "quantum dot"**

The primary dispute here is whether a "quantum dot" is defined in part by its size. Plaintiffs propose that quantum dots are "nanoscale semiconductor particles." (Pl.'s Brief 4-6.) That is, they are defined by being between 1 and 100 nm in size. Defendant finds this definition to be unduly broad and argues that any random atom of such semiconducting material would constitute a quantum dot under Plaintiffs' proposed construction. (Def.'s Brief 19-20.)

The Court begins, as it must, with a review of the claims themselves. The term "quantum dot" is recited in independent Claim 1 and dependent Claims 11 and 12. There is nothing in these claims themselves that would aid the Court in determining whether the term includes a size limitation, nor is there any explicit reference to the size of quantum dots in the specification. In their opening brief, however, Plaintiffs direct the Court to two references that were discussed in the specification and of record during prosecution. (Pl.'s Brief 4.) The first of these, the Ledentsov reference, used transmission electron microscopy to examine synthesized dots and found their size to be "about 20-25 nm." (Declaration of Michael B. Eisenberg ("Eisenberg Decl."), Exh. 1 at 604, ECF No. 62-1.) The second also discussed "[t]he fabrication of very small semiconductor structures" and described them as "typically less than 30 nanometers with narrow

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size distribution, namely within plus or minus five percent of a mean." (Eisenberg Decl., Exh. 2 at 1:19-22, 6:46-49.) Thus, Plaintiffs have provided at least two references that, while not explicitly defining quantum dots by their size, both describe their fabrication in the nanoscale range.

Defendant takes issue with Plaintiffs' characterization of these references, arguing that the first offers no definition of quantum dots, and that the second only serves to undermine Plaintiffs' position. As to the Ledentsov reference, Defendant claims that it "offers nothing in the way of a definition of quantum dots." (Def.'s Brief 3.) The Court agrees. While the reference does discuss that the particular quantum dots created are in the 20-30nm range, it does nothing to describe the size of quantum dots generally. The same is true of the Petroff reference, which, while discussing the growth of dots in the 10-30nm range, does not define them by their size and instead describes quantum dots as "practical structures for quantum confinement . . . in three dimensions." (Eisenberg Decl., Exh. 2 at 1:22-25.) Because neither reference provides a clear definition as to the size of quantum dots, the Court cannot conclude from these two sources alone that a POSITA would have known them to be limited to nanoscale semiconductors.

In their supplemental brief, Plaintiffs identified eight contemporaneous sources which do define quantum dots based on their physical properties, size, and materials. For instance, a journal article published in 1999—contemporaneous to the original German application that led to the '731 Patent—begins with the statement that "[a] quantum dot is a nanometer-sized semiconductor object that acts much like an artificial atom." (Third Declaration of Michael B. Eisenberg ISO Plaintiffs' Supplemental Claim Construction Brief ("3d Eisenberg Decl."), Exh. 2, ECF No. 72-4.) Others describe quantum dots as "semiconductor nanocrystals" or "nanometer-scale semiconductor crystallites," indicating that they exist in the nanometer range. (3d Eisenberg Decl., Exhs. 3-5, 7-8.) Perhaps the most telling explanation is provided in a journal article entitled "Structure and Photophysics of Semiconductor Nanocrystals." (3d Eisenberg Decl., Exh. 6.) This article distinguishes three-dimensional quantum dots from "structures in which the nanometer scale is reached in only one direction in space (quantum wells), or in two (quantum wires)." The thrust of these articles is to define quantum dots, at least in part, by their three-dimensional nanoscale size.

It appears, in fact, that a quantum dot's size is perhaps its most important characteristic. As explained by Plaintiffs' technical expert, Prof. DenBaars, quantum materials exist in the space between the large-scale crystalline "bulk" materials and materials on an atomic scale. (Second Declaration of Prof. Steven DenBaars ("2d DenBaars Decl.") ¶¶ 5-7, ECF No. 72-1.) Bulk and atomic materials exhibit drastically different characteristics even when they have the same chemical makeup, and it is the nanometer or mesoscopic scale where the shift from bulk to atomic characteristics begins to take place. (DenBaars Decl. ¶ 7.) According to Prof. DenBaars, quantum wells (1 nanoscale dimension), quantum wires (2 nanoscale dimensions), and quantum dots (3 nanoscale dimensions), were being explored around the time of the invention, and the '731 Patent arose from that research. (2d DenBaars Decl. ¶¶ 9-12.) Based on this testimony, it

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is clear that "quantum dots," as understood by a POSITA at the time of the invention, must necessarily exist—in all three dimensions—in a size domain between the bulk and atomic scale. Having reviewed the contemporaneous literature provided by Plaintiffs in support of their supplemental brief, the Court concludes that this in-between domain is the "nanoscale."

b. Must the quantum dots be "deposited on a substrate"

The next dispute centers around whether the quantum dots must be "deposited on a substrate," as advanced by the Defendant. Defendant points to the specification, which refers on several occasions to the deposition of quantum dot material onto a substrate. (Def.'s Brief 4-5.) Plaintiffs note that there is nothing in the claims themselves that would require such deposition and argue that Defendant is attempting to impermissibly import the limitation from the specification. (Pl.'s Brief 6-7.) The Court starts again with examination of the claims and notes that there is nothing in the express language of independent Claim 1 that requires quantum dots be deposited on a substrate.

Defendant identifies several references in the specification to the deposition of quantum dots, such as the '731 Patent's statement that "QD semiconductor material has a higher lattice constant than the substrate **on which the QD semiconductor material is deposited.**" ('731 Patent 2:12-15.) The '731 Patent again discusses deposition on the substrate and that growth interruption can be affected by "the faulty orientation of the substrate." ('731 Patent 3:7-9.) Defendant also notes that several of the references provided by Plaintiffs further describe quantum dot layers being deposited directly on substrates. (See Eisenberg Decl., Ex. 1 at 3715 ("The structures were grown on semi-insulating GaAs (100) substrates"); Ex. 2 at 2:20-33 ("The invention is a method of forming quantum dots comprising disposing a material having a first lattice spacing on a substrate having a second unequal lattice spacing . . .").

Plaintiffs argue that these are all merely examples of quantum dots grown on a substrate and do not serve to limit the scope of the claims. They point to a portion of the specification that expressly states that "[a]ccording to the further embodiment of claim 11, restoration of the monolayer surface morphology of the QD cover layer makes it possible to deposit an additional layer of QDs **directly on the cover layer.**" ('731 Patent 3:11-14.) The Court agrees that this statement alone is sufficient to rebut Defendant's proposed limitation. Because Claim 11 depends from Claim 1, it must share each of its limitations, including any requirement that the quantum dot layer be deposited directly on the substrate. To construe the term in this manner would, however, effectively read the aforementioned embodiment out of the patent. This is impermissible. *Vitronics*, 90 F.3d at 1583 (finding that an interpretation which causes "a preferred [] embodiment in the specification [to] not fall within the scope of the patent claim . . . is rarely, if ever, correct"). Accordingly, the Court rejects Defendant's proposal and declines to limit "quantum dot layer" to only those layers that are deposited onto a particular substrate.

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During the *Markman* hearing, Defendant argued that all deposition must necessarily occur on a substrate, as deposition cannot simply happen in the ether. (Transcript of *Markman Hearing*<sup>1</sup> ("CC Transcript") 22:9-16.) As Plaintiffs pointed out, however, this argument conflates the use of the term "substrate" in the general, nonspecific sense, with the term as it is used in the patent to refer to a particular substrate layer. (CC Transcript 23:1-9.) This distinction is important within the context of the patent, as there is clear contemplation of multiple QD layers being placed one on top of the other. In such a situation, each QD layer is indeed deposited onto **a** substrate, but would not be deposited onto **the same** substrate. Thus, while Defendant's proposed limitation is rejected, Plaintiffs will be precluded from arguing that the QDs are not deposited onto **a** substrate in the general sense.

c. Must the quantum dot layer be "distinct from a semiconductor layer"

The final dispute is whether the quantum dot layer must be "distinct from a semiconductor layer," as Defendant proposes. Defendant argues that since the claim language expressly distinguishes between the quantum dot layer and the semiconductor layer which is placed over the QD layer, the two are distinct from one another. (Def.'s Brief 5.) This position is based in part on Claim 1's requirement that the quantum dot layer be "overgrown with a layer of semiconductor material at least thick enough to completely cover all the quantum dots." ('731 Patent 4:15-17.) Plaintiffs argue that this understanding is in direct conflict with the patent's description of the quantum dot layer as comprising "coherent quantum dots . . . overgrown with a layer of semiconductor material." (Pl.'s Brief 7 (quoting '731 Patent 4:13-16).)

Plaintiffs' position is somewhat disingenuous, as the term "comprising" in Claim 1 refers to the method being claimed, not to the "quantum dot layer." Nevertheless, the Court also finds Defendant's position unconvincing as the '731 Patent describes the semiconductor material as being "overgrown" in order to "completely cover all the quantum dots." ('731 Patent, Claim 1.) The fact that the semiconductor layer's thickness is described in terms of "covering" the quantum dots implies that the semiconductor is grown so as to fill in the interstitial space between quantum dots, eventually covering them.<sup>2</sup> Were this not the case, the semiconductor layer would instead be described in terms of its thickness. The quantum dots and the semiconductor material must indeed be separate from one another; however, the Court worries that including this in the definition of "quantum dot layer" risks misleading jurors as to the nature of the layers. Neither party should be permitted to imply that the two layers must be homogenous, flat layers laid one over the other and that the semiconductor material cannot fill in the space between the quantum dots. While the two materials must be distinct, they may both exist within the same layer when viewed in a cross-section.

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<sup>1</sup> A copy of the transcript will issue after payment from both parties is received.

<sup>2</sup> The description in the patent is akin to pouring sand over a jar of pebbles, until the pebbles are completely covered.

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Based on the above analysis, the Court adopts a modified version of Plaintiffs' proposed construction. "Quantum dot layer" shall be construed as "an active medium including three-dimensional nanoscale particles of semiconductor material."

<b>Term</b>	<b>Court's Construction</b>
"quantum dot layer" ('731 Patent)	an active medium including three-dimensional nanoscale particles of semiconductor material

**B. Term 2: "interrupting growth"**

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"interrupting growth" ('731 Patent)	Plain and ordinary meaning  In the alternative: pausing between semiconductor growth steps	redistributing cover layer material to smooth the surface, prevent dislocations, and minimize concentration of dot defects

The second term in dispute is recited in independent Claim 1 of the '731 Patent. Again starting with the claims themselves, Claim 1 describes "the step of interrupting growth of the semiconductor component each time after a layer of coherent quantum dots has been overgrown with a layer of semiconductor material at least thick enough to completely cover all the quantum dots, wherein the step of interrupting growth of the semiconductor component is carried out for each quantum dot layer." ('731 Patent 4:13-20.) Plaintiffs argue for plain and ordinary meaning, or in the alternative, that "interrupting growth" be construed as "pausing between semiconductor growth steps." (Pl.'s Brief 8.) Defendant contends that "interrupting growth" refers to the growth of quantum dots and not the semiconductor growth steps, that growth need merely slow rather than cease, and that the step requires "redistributing cover layer material to smooth the surface, prevent dislocations, and minimize concentration of dot defects." (Def.'s Brief 6.)

Defendant argues that the growth being interrupted is the formation of quantum dots. It purports to base this understanding in the language of Claim 1 which recites "[a] method for improving the efficiency of epitaxially produced quantum dot semiconductor components . . . comprising the step of interrupting growth of the semiconductor components." ('731 Patent, Claim 1.) Defendant interprets this to mean that "the semiconductor component" whose growth is being interrupted is the "quantum dot semiconductor component." (Def.'s Brief 6.) The claim language clearly contradicts this view, however, as it states that growth is interrupted "each time after a layer of coherent quantum dots has been overgrown with a layer of semiconductor material at least thick enough to completely cover all the quantum dots." ('731 Patent 4:15-20.) Thus, it is the growth of the "layer of semiconductor material" that is being interrupted, not the growth of the quantum dots themselves, which have already been overgrown.

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Defendant also asks the Court to include in the definition that the interruption must also "redistribut[e] cover layer material to smooth the surface, prevent dislocations, and minimize concentration of dot defects." It takes this language from the specification which teaches that "[d]uring the interruption in growth, according to this invention, there is a redistribution of the cover layer material, which results in smoothing of the surface." ('731 Patent 3:4-7.) Unlike the case relied upon by Defendant, wherein the patent prefaced its redefinition with "according to the invention . . . , " the present language is taken not from the "description of the invention" section of the specification, but from a description of the "further embodiments according to claims 3 through 10." (Compare '731 Patent 2:63-64, with *Atrazeneca AB, Aktiebolaget Hassle, KBI-E, Inc. v. Mutual Pharm. Co., Inc.*, 384 F.3d 1333, 1339-40.) As such, this does not rise to the level of an express redefinition of the common understanding of the terms.

Ultimately, the Court must conclude that the term "interrupting growth" should be afforded its plain and ordinary meaning. The term is a simple two-word phrase. Both words are common English terms, and nothing in the patent justifies assigning any definition other than their commonly understood meaning.

<b>Term</b>	<b>Court's Construction</b>
"interrupting growth" ('731 Patent)	Plain and ordinary meaning

**C. Term 3: "coherent quantum dots"**

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"coherent quantum dots" ('731 Patent)	nanoscale particles of semiconductor material that are stable with respect to desorption at the temperature and duration of the growth interruption	quantized electronic structures that are stable with respect to desorption at the temperature and duration of the growth interruption

The parties' final disagreement as to the '731 Patent concerns the proper understanding of "coherent quantum dots." The parties agree that the word coherent should be read as requiring the dots to be "stable with respect to desorption at the temperature and duration of the growth interruption" and that the only disagreement stems from the previous dispute regarding the meaning of "quantum dots." (Pl.'s Brief 10.) In accordance with the Court's previous construction of that term (see *supra* Section IV.A.2.a), "coherent quantum dots" is construed to mean "three-dimensional nanoscale particles of semiconductor material that are stable with respect to the desorption at the temperature and duration of the growth interruption."

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<b>Term</b>	<b>Court's Construction</b>
"coherent quantum dots" ('731 Patent)	three-dimensional nanoscale particles of semiconductor material that are stable with respect to desorption at the temperature and duration of the growth interruption

**D. Term 4: "transparent electrode layer"**

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"transparent electrode layer" ('207 Patent)	Plain and ordinary meaning  In the alternative: an electrode layer comprised of material substantially transparent to the emitted light	layer that serves as an electrode together with the electrode pad and has strong electrical characteristics and minimal interruption of light emission

The fourth term identified for construction is the term "transparent electrode layer." The term is recited in independent Claims 1 and 16 and dependent Claims 6, 7, and 17 of the '207 Patent. Plaintiffs propose that the term be construed in accordance with its plain and ordinary meaning, or in the alternative as "an electrode layer comprised of material substantially transparent to the emitted light." Defendant proposes the term be construed as a "layer that serves as an electrode together with the electrode pad and has strong electrical characteristics and minimal interruption of light emission."

**1. '207 Patent Technological Background**

The '207 Patent is entitled "Light Emitting Diode" and issued on July 19, 2011. ('207 Patent, Caption.) It claims priority to an earlier Korean patent application filed October 29, 2007. ('207 Patent, Caption.) As explained in the summary of the invention, the '207 Patent provides for "an LED having a distributed Bragg reflector (DBR) formed under a p-type electrode pad to reduce light absorption and light loss and to spread light to surroundings of the DBR." ('207 Patent, Summary.)

The patent explains that in a typical gallium nitride-based LED, "light is mainly emitted through a portion of the transparent electrode layer." ('207 Patent 1:33-34.) Therefore, "when selecting a material for the transparent electrode layer, it should have strong electrical characteristics and should minimally interrupt light emission." ('207 Patent 1:34-37.) In conventional LEDs, however, a portion of the electrode is etched away and an opaque electrode pad is placed in direct contact with the underlying active layer. ('207 Patent 1:44-47.) Because the electrode pad is in direct contact with the active layer and is more conductive than the transparent electrode layer, a disproportionate amount of current flow—and therefore light generation—is

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concentrated just under the opaque electrode pad, resulting in light absorption and a loss of efficiency. ('207 Patent 1:49-55.)

The '207 Patent seeks to solve this problem by placing a distributed Bragg reflector just under the electrode pad. ('207 Patent 1:64-67.) The DBR reduces light absorption and light loss and spreads light to the surrounding area. ('207 Patent 1:64-67.)

2. Analysis

Plaintiffs claim that the phrase "transparent electrode layer" contains only common English language words that require no further construction. They assert it is well understood that an electrode is a conductor for providing an electric current, and the words "transparent" and "layer" describe two characteristics of the electrode. It must allow light to pass through and must comprise a material. Defendant argues that the patent specification provides an express definition. The dispute between the parties ultimately centers around two issues: (1) must the transparent electrode layer be an "electrode together with an electrode pad," and (2) must "transparent" be construed as "substantially transparent" or "minimal interruption of light emission."

According to Defendant, "transparent electrode layer" is not a term of art, but is unique to the patent. This claim is suspect given, as Plaintiffs observe, that a search of the U.S. Patent database reveals more than 5,000 patents using the term. Indeed, even a Westlaw term search results in multiple cases containing the term. While it appears that "transparent electrode layer" is a commonly used and understood term in its own right, the Court nevertheless looks first to the patent itself.

As to the first dispute, Defendant relies on a portion of the specification, which states that "[i]n such an LED, light is mainly emitted through a portion of the transparent electrode layer, which serves as an electrode together with the electrode pad." ('207 Patent 1:32-34.) Defendant argues that this is an express definition of the term. The Court disagrees. As an initial matter, the portion of the specification relied upon describes the prior art background of the invention and not the invention itself. Furthermore, the included language does not state that the transparent electrode layer includes both an electrode and an electrode pad. On the contrary, it states that the transparent electrode layer, **when combined with an electrode pad**, serves as an electrode. For this reason, the Court rejects Defendant's proposed limitation that the transparent electrode layer be an "electrode together with an electrode pad."

The second dispute hinges on the meaning of the word "transparent." Defendant again turns to the specification for its proposed limitation. In the prior art background, the '207 Patent states that "when selecting a material for the transparent electrode layer, it should have strong electrical characteristics and should minimally interrupt light emission." ('207 Patent 1:34-37.) While this is again lifted from a description of the prior art and does not directly describe the present

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invention, it nevertheless indicates the properties that a POSITA looks for in a transparent electrode layer. This is supported by the testimony of Prof. DenBaars, who states that "people of ordinary skill in the art are concerned with providing strong electrical connections to the device, but without blocking too much of the light that would otherwise be emitted." (2d DenBaars Decl. ¶ 15.) He explains that "the prototypical transparent electrode layer in the light-emitting-diode field is indium tin oxide (ITO)," which, when applied in a thin layer "is essentially a colorless and clear material that is capable of providing a strong electrical connection to the device while permitting a substantial amount of the generated light to pass through." (2d DenBaars Decl. ¶ 17.) While the parties quibble as to whether the transparency should be described as "substantially transparent" or as "minimal[ly] interrupt[ing] light emission," the Court does not perceive a significant distinction between the two. Accordingly, the Court adopts the verbiage from the patent itself and concludes that a transparent electrode layer must have strong electrical characteristics and minimally interrupt light emission.

In what is perhaps an overly optimistic attempt to avoid future disputes between the parties, the Court notes that Indium Tin Oxide ("ITO")—the prototypical transparent electrode—is clearly contemplated by the '207 Patent as meeting the definition of a transparent electrode layer. The '207 Patent expressly states in the Detailed Description of the Illustrated Embodiments portion of the specification that "[a]n indium tin oxide (ITO) transparent electrode layer having excellent transmittance of visible light is used as the transparent electrode layer 320 and arranged on the p-type semiconductor layer 260." ('207 Patent 3:16-19.) Excluding ITO from the definition of transparent electrode layer would therefore impermissibly read a preferred embodiment out of the claim's scope.

<b>Term</b>	<b>Court's Construction</b>
"transparent electrode layer" ('207 Patent)	an electrode layer comprised of material exhibiting strong electrical characteristics and minimal interruption of light emission

**E. Term 5: "heat dissipating slug"**

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"heat dissipating slug" ('054 Patent)	Plain and ordinary meaning  In the alternative: a structure composed of conductive material used to conduct heat away from a light emitting diode	a unitary mass structure without fins, vanes, or similar surface-area enhancements, composed of conductive material used to conduct heat away from a light emitting diode

While this term was identified for construction in the parties' joint claim construction statement, Defendant states in its brief that it "agrees to Plaintiffs' definition of 'heat dissipating slug.'" (Def.'s

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Brief 2, n.1.) Accordingly, the Court construes the term "heat dissipating slug" as "a structure composed of conductive material used to conduct heat away from a light emitting diode."

<b>Term</b>	<b>Court's Construction</b>
"heat dissipating slug" ('054 Patent)	a structure composed of conductive material used to conduct heat away from a light emitting diode

F. Term 6: "rectifying bridge unit"

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"rectifying bride unit" ('988 Patent)	Plain and ordinary meaning  In the alternative: a circuit element that converts alternating current into unidirectional current	a circuit including multiple diodes for converting alternating current into direct current

The next term for construction is "rectifying bridge unit," recited in the '988 Patent. Again, Plaintiffs propose the term be construed in accordance with its plain and ordinary meaning, or in the alternative, as "a circuit element that converts alternating current into unidirectional current." Defendant proposes that it be construed as "a circuit including multiple diodes for converting alternating current into direct current."

1. '988 Patent Technological Background

The Court commences with an overview of the patent. The '988 Patent, entitled "Light Emitting Element with a Plurality of Cells Bonded, Method of Manufacturing the Same, and Light Emitting Device Using the Same," issued on May 1, 2012 and claims priority to an earlier Korean patent application filed June 29, 2005. ('988 Patent, Caption.) The invention relates to "a light emitting element with arrayed cells, a method of manufacturing the same, and a light emitting device using the same." ('988 Patent, Abstract.)

The patent states that an LED for general illumination is manufactured by serially connecting a plurality of light emitting elements, each of which has a light emitting chip mounted thereon. ('988 Patent 1:58-61.) In the Background of the Invention, the patent explains that in a light emitting device manufactured according to prior art, there is a problem in that the metal wiring process performed for a large number of elements, one by one, increases the processing steps. As the number of process steps increases, the defective fraction also increases. ('988 Patent 1:66-2:6.) Moreover, the wiring of these elements in series results in larger arrays of elements than is often desirable in certain small applications. ('988 Patent 2:9-12.) The '988 Patent seeks to address these challenges by describing a single chip that contains multiple light emitting elements connected in series. ('988 Patent 2:33-43.) By manufacturing multiple elements on

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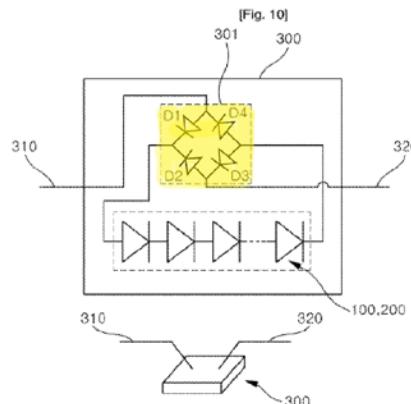
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the same chip, the patent saves space and avoids a drawn out and defect-prone wiring process. ('988 Patent 2:33-43.)

One component of the invention is a "rectifying bridge unit" that converts alternating current to direct current and allows the light emitting element to "continuously emit[] light regardless of whether a power source is an AC power source." ('988 Patent 12:62-64.) The patent describes "an advantage in that DC driving efficiency can be enhanced in an AC operation by installing a predetermined rectifying circuit outside the light emitting element." ('988 Patent, Abstract.) The rectifying bridge unit is described as "comprising a first diode, a second diode, a third diode, and a fourth diode" and as being "connected to the power source unit." ('988 Patent, Claim 1.) An example of this unit can be seen in Figure 10:



('988 Patent, Fig. 10.)

In at least one of the preferred embodiments, the rectifying bridge unit is connected in parallel to a resistor-capacitor ("RC") circuit which serves to "minimiz[e] a ripple factor in an AC current and prevent[] overload." ('988 Patent 14:17-18.)

## 2. Analysis

Again, there are two primary disputes between the parties as to this claim term: (1) whether a "rectifying bridge unit" is correctly characterized as a circuit or as a circuit element, and (2) whether the output of a rectifying bridge unit should be characterized as "unidirectional" or "direct." Plaintiffs' expert contends that a rectifying bridge unit is "a well-known discrete electronic device" that functions by "tak[ing] an alternating current as an input and provid[ing] unidirectional current as an output." (2d DenBaars Decl. ¶¶ 18-19.) Plaintiffs acknowledge that the disputes are not substantive, but relate solely to accuracy and clarity.

As to the first issue, Plaintiffs claim that in ordinary usage, a circuit refers to a complete electrical pathway, whereas a circuit element refers to a component within such a pathway. (Pl.'s Brief 14.) They point to several technical dictionaries that define "circuit" and "element" in this manner.

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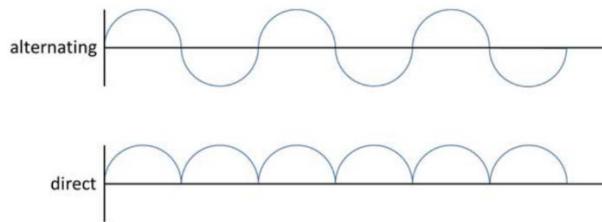
Defendant counters that the phrase "circuit element" does not appear anywhere in the specification itself and that the use of the term would therefore conflict with its express teachings. (Def.'s Brief 10.)

Examining the '988 Patent, it does not disclose a solitary electrical pathway, but instead a single component of a larger circuit. It describes that a rectifying bridge unit is, for instance, connected to the power source and a control unit and states that its purpose is to serve as a filter of sorts, ensuring that only unidirectional current passes through the remainder of the device. ('988 Patent, Claim 1; *id.* 2:66-3:1.) The parties do not appear to disagree, then, that the rectifying bridge unit does not stand alone, but is instead connected to other electrical components.

The second dispute is largely prophylactic and concerns whether the current output should be characterized as "unidirectional" or "direct." Plaintiffs explain that "direct current" is commonly defined as a "constant-value" current that flows in a single direction, whereas the output from a rectifying bridge unit is not constant, but instead varies over time in accordance with the frequency and amplitude of the alternating current being converted. As Plaintiffs' expert explains:

[A]lternating current can be understood as a sine-like pattern, which a first half-cycle comprising a current of electrons moving in the forward direction and then a second half-cycle comprising a current of electrons moving in the reverse direction. A rectifier takes that reversing current as an input and passes only unidirectional current as an output.

(2d DenBaars Decl. ¶ 19.) Plaintiffs provide an illustration of this ripple effect in their brief:



(Pl.'s Brief 15.) According to contemporaneous electronics textbooks provided by the Plaintiffs, users often make efforts to minimize this effect by attaching a resistor and capacitor in parallel to the rectifying bridge unit, resulting in a significant reduction in ripple:

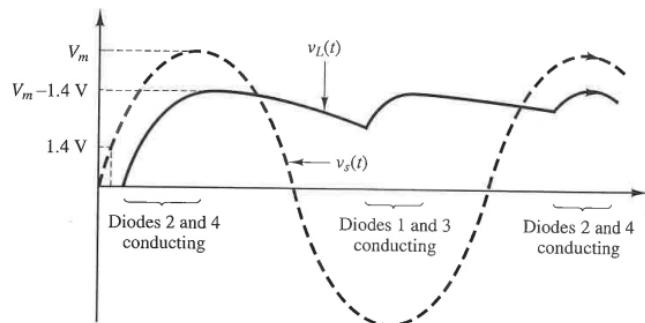
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(3d Eisenberg Decl., Exh. 23, Fig. 7.16.) Because of the ripple effect, Plaintiffs contend that Defendant's proposed construction would merely create more ambiguity regarding the definition of "direct current" (i.e., whether it requires a constant-value current) that would later require resolution. (Pl.'s Brief 14-15.) In its brief, Defendant fails to address whether it plans to make such an argument and instead simply states that the '988 Patent never refers to "unidirectional current," yet uses "direct current" or "DC" throughout the specification. (Def.'s Brief 10.) During the claim construction hearing, however, Defendant stated that it did not intend to argue that the '988 Patent requires a constant value current. (CC Transcript 52:16-24.)

Plaintiffs' concern is valid and it is important to note that the ripple effect caused by the rectifying bridge unit is contemplated in the patent itself, which, in some embodiments, describes the use of an RC circuit—similar to that described in the prior art—to "minimiz[e] a ripple factor in an AC current and prevent[] overload." ('988 Patent 14:17-18.) Nevertheless, rather than swap a common electrical term for a less common one that appears nowhere in the patent, the Court construes "rectifying bridge unit" as "a circuit element that converts alternating current into direct current." In light of the clear contemplation of ripple, however, Defendant is precluded from arguing to the jury that the '988 Patent requires a constant-value current.

Term	Court's Construction
"rectifying bride unit" ('988 Patent)	a circuit element that converts alternating current into direct current

**G. Term 7: "distributed Bragg reflector"**

Term	Plaintiffs' Construction	Defendant's Construction
"distributed Bragg reflector" ('157 Patent)	Plain and ordinary meaning  In the alternative: a reflector comprised of pairs of multiple dielectric layers having different indices of refraction	reflector having a high reflectivity over a wide wavelength range and formed to reflect light by repeating a plurality of pairs of at least two different

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		material layers, with the different material layers affecting a reflector's reflectivity for light of the same wavelength
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The next term for construction is "distributed Bragg reflector." The term appears in independent Claim 1 and in many of the dependent claims of the '157 Patent. Plaintiffs propose a plain and ordinary meaning, or in the alternative, that the term be construed as a "reflector comprised of pairs of multiple dielectric layers having different indices of refraction." Defendant instead proposes a "reflector having a high reflectivity over a wide wavelength range and formed to reflect light by repeating a plurality of pairs of at least two different material layers, with the different material layers affecting a reflector's reflectivity for light of the same wavelength."

1. '157 Patent Technological Background

The '157 Patent is entitled "Light Emitting Diode Chip Having Distributed Bragg Reflector and Method of Fabricating the Same." ('157 Patent, Caption.) It issued on February 21, 2017 and claims priority to an earlier Korean patent application filed November 13, 2009. ('157 Patent, Caption.) The claimed invention provides for "a light-emitting diode package." ('157 Patent, Abstract.)

In the Background of the Invention, the patent describes how the light output from a light emitting diode package is often limited by the light emission efficiency of the light emitting diode chip. ('157 Patent 1:36-40.) Prior research attempted to increase this efficiency by using a metal reflector or distributed Bragg reflector on the bottom surface of a transparent substrate. ('157 Patent 1:43-45.) These efforts resulted in an increase in reflectivity and subsequent decrease in the reabsorption of emissions. ('157 Patent 1:46-54.) Unfortunately, the use of a DBR is only able to increase the reflectivity for a portion of the visible range. ('157 Patent 1:64-65.) For instance, while a DBR may show high reflectivity for blue light, it may be considerably less effective at reflecting green and/or red light. ('157 Patent 2:5-11.)

The '157 Patent attempts to address this weakness by pairing two complementary Bragg reflectors, each with a different optical thickness and therefore a different reflective wavelength range. ('157 Patent 2:27-29; *id.* 2:51-56.) An exemplary embodiment may be seen in Figure 3 below, wherein elements 40 and 50 represent the two DBRs with different optical characteristics:

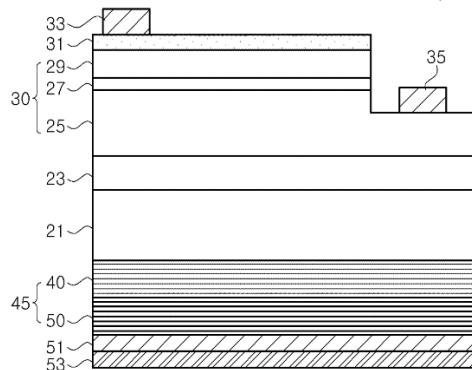
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('157 Patent, Fig. 3.)

## 2. Analysis

The parties agree the term reflector requires no construction. The parties also agree that a "distributed Bragg reflector" consists of pairs of layers. Their disagreement concerns how those layers are characterized.

Plaintiffs describe the layers as having "different indices of refraction." Plaintiffs acknowledge that their phrase does not appear in the claims or the specification, however they argue that it is implied by the use of the term "optical thickness," recited in the claims. (Pl.'s Brief 16.) They point to the patent specification, which defines optical thickness as the index of refraction of a material multiplied by its physical thickness. ('157 Patent 6:53-54.) In the present invention, optical thickness cannot be changed by altering only the physical thickness of materials with the same index of refraction, as this would obviate the requirement that there be distinct layers and would not reflect light in the manner of a DBR as understood in the art. Thus, while the physical thickness of the layers may or may not change between the layers, choosing materials with different indices of refraction is required to differentiate the optical thickness between layers. The Court finds the use of this term to be helpful to potential jurors' understanding of the technology at issue in the '157 Patent.

The primary dispute concerns Defendant's claim that the overall DBR described in the '157 Patent must "hav[e] a wide reflectivity over a wide wavelength range." (Def.'s Brief 11.) In support, Defendant points to a portion of the specification which states that:

[T]he plurality of pairs of first material layer 40a and second material layer 40b have relatively higher reflectivity for light of a red wavelength range, for example, 550 nm or 630 nm, than for light of a blue wavelength range and the second distributed Bragg reflector 50 may have relatively higher reflectivity for light of a blue wavelength range, for example, light of 460 nm than for light of a red or green wavelength range.

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('157 Patent 6:31-38.) Plaintiffs disagree, arguing that, while in some embodiments reflectors may indeed be broad spectrum, there is no support in the patent for the contention that all reflectors must be so. (Pl.'s Brief 16-17.)

In order to resolve this dispute, it is important to understand the purpose of the invention claimed by the '157 Patent. As discussed above, prior art devices that utilized only a single DBR suffered from reflectivity that varied greatly over the wavelength spectrum. Such devices may, for instance, have excellent reflectivity of blue light, but poor reflectivity of red light. The '157 Patent seeks to address this problem by placing a pair of DBRs with different spectral reflectivity. For example, by pairing a DBR with poor red reflectivity and excellent blue reflectivity with a DBR having excellent red reflectivity and poor blue reflectivity, their respective deficiencies can be mitigated and a broader spectrum of light reflected. While an ideal pair of DBRs would result in a wide spectrum of reflectivity, the patent merely contemplates that the spectrum be **wider** than a single DBR alone. Thus, it is required that the two DBRs have **different** reflectivity profiles, however nothing in the patent requires the range to be described as "wide."

Regardless, it would not be appropriate to read such a limitation directly into the claim term "distributed Bragg reflector" itself, which is used to refer not only to the overarching element, but also to each of its sub-components. Claim 1 discloses "a distributed Bragg reflector . . . compris[ing] a first distributed Bragg reflector and a second distributed Bragg reflector." Neither party argues that it is reasonable to require the first and second DBRs to each have a wide spectral range, yet that is exactly what Defendant's proposed construction would do. For these reasons, the Court rejects the addition of a spectral range requirement and instead construes "distributed Bragg reflector" as "a reflector comprised of pairs of multiple dielectric layers having different indices of refraction."

Term	Court's Construction
"distributed Bragg reflector" ('157 Patent)	a reflector comprised of pairs of multiple dielectric layers having different indices of refraction

H. Term 8: "multi quantum well structure"

Term	Plaintiffs' Construction	Defendant's Construction
"multi quantum well structure" ('210 Patent)	plain and ordinary meaning  In the alternative: an active region comprised of multiple light emitting layers separated by barrier layers	structure in which a barrier layer and InGaN quantum well layer are alternatively stacked

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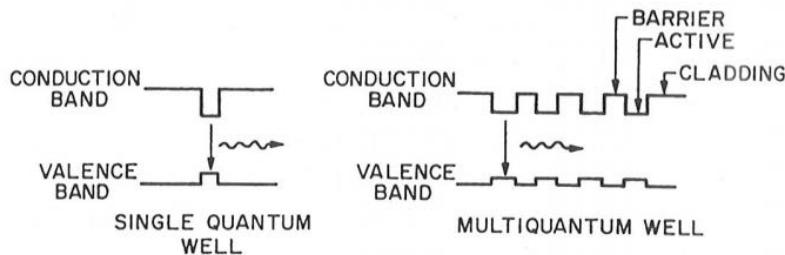
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1. '210 Patent Technological Background

The '210 Patent issued on July 25, 2017 and claims priority to an earlier Korean patent application filed January 5, 2010. ('210 Patent, Caption.) The claimed invention provides for "a light emitting diode with improved electrostatic discharge characteristics and/or luminous efficiency and a method of fabricating the same." ('210 Patent 1:25-28.)

The patent explains that existing gallium nitride ("GaN") semiconductors may be used for ultraviolet or blue-green light emitting diodes. ('210 Patent 1:30-34.) These devices typically use an indium gallium nitride ("InGaN")-based multi-quantum well structure that is disposed between n-type and p-type GaN semiconductor layers. ('210 Patent 1:34-38.) Such devices emit light through the recombination of negative electrons and positive holes within the quantum well layer. ('210 Patent 1:38-40.) The patent identifies several situations that may cause deterioration or an overall drop in efficiency. These include the application of high voltage, lattice mis-match leading to interfacial strain, defects caused by Si doping of barrier layers, and efficiency droop caused by thermal vibration. ('210 Patent 1:65-2:57.) The '210 Patent seeks to remedy these problems by placing a plurality of layers between the superlattice structure and the n-type contact layer. ('210 Patent 3:31-44.)

In his declaration, Prof. DenBaars explains that quantum wells are commonly used in light generating layers of LED devices and rely on the concept of quantum confinement—providing wider bandgap barriers around a lower bandgap structure. (2d DenBaars Decl. ¶ 23.) The term "multi-quantum wells" refers to a structure in which there are stacks of multiple layers that alternate between lower bandgap wells and higher bandgap barriers. (2d DenBaars Decl. ¶ 24.) A comparison of the band diagram can be seen in a contemporaneous textbook provided by Plaintiffs:



(3d Eisenberg Decl., Exh. 25, Fig. 9.4.)

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**2. Analysis**

The "detailed description of the illustrated embodiments" section of the '210 Patent specification describes a "multi-quantum well structure in which a barrier layer and a quantum well layer are alternately stacked, wherein the quantum well layer includes an InGaN layer." ('210 Patent 11:30-33.) Defendant contends that this constitutes an express definition and asks the Court to require that InGaN be the material used for the quantum well layer of the multi-quantum well structure. Plaintiffs argue that this is merely a specific embodiment and claim that the structure merely requires alternating layers of any barrier and well material. The Court finds that neither proposed definition fully comports with the patent's definition of the term.

An examination of the claim itself demonstrates that Plaintiffs' definition is impermissibly broad. Claim one describes "an active region disposed between the n-type contact layer and the p-type contact layer and comprising a multi-quantum well structure including a quantum well layer that includes a composition ratio of Indium (In) and a barrier layer." ('210 Patent, Claim 1.) The express requirement that the well layer "include[] a composition ratio of Indium" is significantly more specific than Plaintiffs' request that any material may be used so long as there are multiple well and barrier layers. Plaintiffs' counsel acknowledged as much during the hearing, stating that "Indium is a requirement. There has to be a composition that includes indium." (CC Transcript 71:13-15.)

Defendant's proposed definition, however, goes too far. While it is true that the patent twice refers to the well layer as being composed of InGaN, this description is found in the portion of the specification describing specific embodiments. (See '210 Patent 7:25-27, 11:30-33.) Given that the claim language itself is less restrictive and clearly contemplates the use of other In-containing materials, restricting the construction to a single material is inappropriate. Accordingly, the Court construes the term "multi quantum well structure" as a "structure in which a barrier layer and a quantum well layer including a composition of Indium are alternatively stacked."

<b>Term</b>	<b>Court's Construction</b>
"multi quantum well structure" ('210 Patent)	structure in which a barrier layer and a quantum well layer including a composition of Indium are alternatively stacked

**I. Term 9: "superlattice layer"**

<b>Term</b>	<b>Plaintiffs' Construction</b>	<b>Defendant's Construction</b>
"super-lattice layer" ('210 Patent)	a semiconductor layer including a plurality of barrier sublayers alternating with a plurality of well sublayers	structure that includes a first layer grown on and directly contacting an electron reinforcing layer, a final layer that the active layer grows

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		upon and directly contacts, the final layer doped with a high-concentration silicone
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Plaintiffs contend that superlattices are a class of structures well-known in the art and that a POSITA need merely be informed of its existence, not its specific placement within the device. (Pl.'s Brief 18.) Defendant argues that the patent requires that the superlattice structure be placed **directly** between an electron reinforcing layer and the active layer. (Def.'s Brief 14.) In support of this argument, it points to the following portion of the specification:

The superlattice layer 63 is formed on the electron reinforcing layer 61. The superlattice layer 63 may be formed by alternately stacking the GaN layer and the InGaN layer at a thickness of, for example, 20 Å. A first layer of the superlattice layer 63 may be made of GaN or InGaN, but the final layer may be made of GaN. The first layer of the superlattice layer 63 directly contacts the electrode reinforcing layer 61, and the final layer of the superlattice layer 63 directly contacts the active layer 65. The final layer of the superlattice layer 63 is doped with the high-concentration Si . . . . Therefore, the final layer of the superlattice layer 63 and the electron reinforcing layer 61 below the superlattice layer 63 are formed of a high-concentration Si doped layer and the remaining layers of the superlattice layer 63 positioned therebetween are formed of substantially undoped GaN or InGaN.

('210 Patent 6:31-53.) This language is taken from the portion of the specification detailing specific embodiments and comports with descriptions found consistently throughout the patent, from the Abstract to the Summary of the Invention, which describe, in order: (1) an n-type contact layer, (2) an undoped intermediate layer, (3) an electron reinforcing layer, (4) a superlattice layer, and (5) an active layer. ('210 Patent, Abstract; *id.* 3:31-4:3; 6:1-53.) However, each time this organization is discussed, it is prefaced by language describing it as an "exemplary embodiment" or an "experimental example."

The language found in Claim 1 itself is substantially more broad, stating simply that the superlattice structure must be "disposed near the active region" and that there be a "spacer layer including a plurality of layers disposed between the superlattice layer and the n-type contact layer and having a bandgap smaller than that of the barrier layer and greater than that of the quantum well layer." ('210 Patent, Claim 1.) Nowhere does it mention an "electron reinforcing layer," much less that such a layer must be in direct contact with the superlattice structure. While independent Claim 6 does appear to describe the intermediate and electron reinforcing layers, their inclusion constitutes an additional limitation. The adoption of Defendant's proposed construction would read this limitation into the term itself and effectively ignore the difference in scope between Claim 1 and Claim 6. The doctrine of claim differentiation forbids such a result. See *Versa Corp. v. Ag-Bag Int'l Ltd.*, 392 F.3d 1325, 1330 (Fed. Cir. 2004) ("The doctrine of claim differentiation 'create[s] a presumption that each claim in a patent has a different scope.'") (quoting *Comark Commc'nns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998)). For

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this reason, the Court rejects Defendant's proposed construction and instead construes "superlattice structure" as "a semiconductor layer including a plurality of barrier sublayers alternating with a plurality of well sublayers."

<b>Term</b>	<b>Court's Construction</b>
"super-lattice layer" ('210 Patent)	a semiconductor layer including a plurality of barrier sublayers alternating with a plurality of well sublayers

**IV. RULING**

For the foregoing reasons, the Court construes the disputed claim terms as follows:

<b>Term</b>	<b>Construction</b>
"quantum dot layer"	an active medium including three-dimensional nanoscale particles of semiconductor material
"interrupting growth"	plain and ordinary meaning
"coherent quantum dots"	three-dimensional nanoscale particles of semiconductor material that are stable with respect to desorption at the temperature and duration of the growth interruption
"transparent electrode layer"	an electrode layer comprised of material with strong electrical characteristics and minimal interruption of light emission
"heat dissipating slug"	a structure composed of conductive material used to conduct heat away from a light emitting diode
"rectifying bridge unit"	a circuit element that converts alternating current into direct current
"distributed Bragg reflector"	a reflector comprised of pairs of multiple dielectric layers having different indices of refraction
"multi quantum well structure"	structure in which a barrier layer and a quantum well layer including a composition of Indium are alternatively stacked
"superlattice layer"	a semiconductor layer including a plurality of barrier sublayers alternating with a plurality of well sublayers

IT IS SO ORDERED.